

THE MISTLETOES OF THE BAHAMAS

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In the process of revising the Bahama flora with Mr. George R. Proctor, I have studied the Bahama mistletoes in an effort to distinguish the four species of *Dendropemon* and the four species of *Phoradendron* as reported in the Bahama Flora (Britton and Millspaugh, 1920). As a result, I have come to recognize only two species of *Dendropemon* in the Bahamas and three of *Phoradendron*, with two of the latter being questionably different from one another.

Urban's treatment (1897) of *Dendropemon* is the closest to a monographic revision that we have for that genus. The most recent treatise for *Phoradendron* (Trelease, 1916) is now 60 years old. General closely allied to *Dendropemon* -- *Ixocactus*, *Phthirusa*, *Struthanthus*, and *Oryctanthus* -- have not been monographed. Most of our knowledge of the Viscaceae and Loranthaceae in recent years has come from the careful and thorough morphological work of Dr. Job Kuijt, but he has not worked with *Dendropemon*.

This treatment of the mistletoes must unfortunately be considered preliminary, to be continued by someone who will apply biosystematic techniques to his studies. Its purpose is solely to arrive at applicable names for our flora. No species descriptions and no citations are included at this juncture. I have attempted here to bring some harmony within the mistletoes in regard to floras from regions adjacent to the Bahamas: South Florida (Long and Lakela, 1971), Cuba (Léon and Alain, 1951), Jamaica (Adams, 1972), and Hispaniola. Unlike the authors of these floras, I follow Kuijt (1968) in recognizing the Loranthaceae of Britton and Millspaugh to be two families (Loranthaceae and Viscaceae). The types of all species names herein have been consulted, including those in European herbaria.

The mistletoes are known collectively in the Bahamas as "proud tree." This local name is supposedly derived from the concept that the plants, being parasites, are too proud to grow in the ground.

Various workers have attempted to make all *Dendropemon* into members of the genus *Phthirusa*. Engler (1897), for example, treated *Dendropemon* as a section of *Phthirusa*. Dr. Job Kuijt (personal communication) feels that the generic distinctions are valid.

Phthirusa has flowers in triads on the raceme and *Dendropemon* has flowers borne singly (Kuijt, personal communication). Adams (1972) further noted that the bract and bracteoles in *Phthirusa* are fused to one another under each 3-flowered cluster, whereas *Dendropemon* has the bracteoles fused under each flower. It is not a matter so much of fusion as number of flowers per unit. (See Kuijt and Weberling, 1972). Moreover, *Phthirusa* is primarily a genus of continental Latin America (Central and South America), but *Dendropemon* is confined to the West Indies. Only on Jamaica does one find both genera, with two species each (Adams, *ibid.*).

Although several *Dendropemon* and *Phoradendron* species present in the Bahamas were published originally as species of *Viscum*, there was a period in the nineteenth century when most workers considered a broad generic concept uniting many presently recognized genera under the umbrella of *Loranthus*, following Blume (1830). Both *Dendropemon* and *Phthirusa* have their origin as published names in that same year (1830); should one wish to unite these genera, the question of which one is older becomes significant. Stearn (1968) analyzed this problem and found that *Phthirusa* Martius was published as a genus in February and *Dendropemon* Blume appeared as a Section name (under *Loranthus*) in August. The name *Dendropemon* was recorded again at sectional rank by Schultes and Schultes in late 1830. It was elevated to generic rank by Reichenbach (Repert. Herb. 73) in 1841. Later, in 1894, VanTieghem (Bull. Soc. Bot. France 41: 71) treated the generic name as masculine, and thus its gender (which could be masculine, feminine, or neuter) was determined.

Thus, *Dendropemon* is younger than *Phthirusa* as a name, but older than its putative synonym *Triarthron* Baillon (Bull. Soc. Linn. Paris 1892: 985), all of which is discussed fully in Stearn (*ibid.*) following the treatment of Loranthaceae (*sensu lato*) by Danser (1933). Other examinations of generic relationships within this group were published by Eichler and Urban (1903), Baehni (1937), and an intriguing study of cytogeography by Barlow and Wiens (1971).

KEY TO GENERA OF MISTLETOES IN THE BAHAMAS

- Inflorescence with flowers distant, paired in raceme-like fashion, each subtended by bracts and bracteoles; perianth members six, free; flowers normally bisexual.....*Dendropemon*
 Inflorescence with glomerate flowers sunk into pits in articulated spikes; perianth members 3, united at the base at least in staminate flowers; flowers unisexual.....*Phoradendron*

DENDROPEMON

There appear to be only two species of *Dendropemon* in the Bahamas instead of the four considered by Britton and Millspaugh (1920). *Dendropemon emarginatus* and *D. bahamensis* differ, according to Britton and Millspaugh, in leaf tip, angularity of twigs, and degree of scaly of the inflorescence, but are herein treated as synonymous.

Bahama materials vary, perhaps having a greater portion of leaves tending to be acute -- at least in older herbarium specimens observed by Britton and Millspaugh. But there is variation even on the type collections of *D. bahamensis*. Some leaves are emarginate; some have a mucro; others are lanceolate and acute with a small retuse tip. On the isotype of *D. bahamensis* at the Field Museum, no leaf is acute (although Britton claims acuteness as a distinguishing trait): all are rounded, obtuse, or emarginate. Degree of furfuraceousness also varies, as observed in more recent collections plus observations in the field. Inflorescence scales are not a useful character, especially if one examines *D. emarginatus* elsewhere in the Greater Antilles.

The angularity of which Britton and Millspaugh wrote is, in fact, a matter of cortical ridges on some twigs of the season. These are present occasionally on individual twigs of *D. emarginatus* throughout its range and are not restricted to Bahama material. As a consequence of their similarity, *D. bahamensis* is treated as a synonym of *D. emarginatus*.

Britton (in Britton and Millspaugh) described *D. brevipes* from a single collection with immature fruit and yet named the "subglobose" nature of the fruit as one of two key characters. Furthermore, he indicated that the sessile nature of the leaves was also a distinguishing character separating *D. brevipes* from *D. purpureus*. Such a leaf character did not prompt him to discern differences between *D. bahamensis* and *D. emarginatus*. If one examines the same material which was available to Britton and Millspaugh, one will see wide variation in petiole length. Furthermore, no flowering material of "*D. brevipes*" is known. It appears that *D. brevipes* is but a single biotype or perhaps more likely just a representation of a few branches, and not representative of a species distinct from *D. purpureus*. I am therefore treating it as synonymous with *D. purpureus*.

KEY TO BAHAMA DENDROPEMON SPECIES

- Inflorescence glabrous, not scaly; leaves narrow.....*D. purpureus*
 Furfuraceous inflorescence; leaves broad.....*D. emarginatus*

- Dendropemon purpureus* (L.) Krug & Urban, Bot. Jahrb. 24: 26. 1897.
Allohemia purpurea (L.) Raf., Sylva Tellur. 1838.
Phthirusa purpurea (L.) Engl. in Engl. & Prantl, Naturl. Pflanzenfamilien 1: 135. 1897. Basionym: *Viscum purpureum* L., Sp. Pl. 2: 1023. 1753. Lectotype: Illustration in Catesby (1731-43); Typotype: BM.
- Dendropemon brevipes* Britton in Britton & Millspaugh, Bahama Flora, p. 108. 1920. Type: Long Island, Galloway Road, Clarence Town, on *Swietenia*, Britton & Millspaugh 6324. Holotype: NY; isotype: F-199050.
- Dendropemon emarginatus* (Sw.) Steudel, Nomencl. ed. 2: 491. 1841. Basionym: *Loranthus emarginatus* Sw., Prodr. 58. 1788, non *L. emarginatus* DC., Prodr. 4: 288. 1830.
Phthirusa emarginata (Sw.) Eichl. in Mart., Flora Bras. 13 I: 110. 1830. Type: Swartz, s.n. Lectotype: BM.
- Dendropemon bahamensis* Britton in Britton & Millspaugh, Bahama Flora, p. 109. 1920. Type: New Providence, Nassau, on *Lysiloma sabicu*, Britton & Brace 269. Holotype: NY; isotype: F-185929.

PHORADENDRON

Contrasted to *Dendropemon*, *Phoradendron* in the Bahamas poses more taxonomic questions and fewer nomenclatural ones. Its treatments by Trelease (1915 and 1916) and its later further refinement for the West Indies by Urban (1920) have been thorough but out of date. We are left with rather tenuous characters to separate the species in the key contrived by Britton and Millspaugh, perhaps because of the minor differences separating *Phoradendron rubrum* and *Ph. trinervium*. I believe that they are conspecific, but still treat them herein as distinct, because I believe more evidence is needed to demonstrate their relation to one another.

Only in the Bahamas do these species and *Ph. racemosum* all overlap. The characters used in separating populations may be variables themselves: number of joints of the inflorescence, length of leaves, shape and color fruits. When herbarium specimens of these two species are examined, the colors of the living plant having shifted to nearly black, only the name on the label and place of origin are certain means of distinguishing some populations!!

I took length/width measurements of 25 randomly chosen leaves on herbarium specimens labeled *Ph. rubrum* (from Bahamas and Cuba) at

the Field Museum and also of 34 randomly chosen leaves from herbarium specimens labeled *Ph. trinervium* (from Bahamas and Hispaniola). The results followed:

	number of measurements	mean	range
<i>Ph. rubrum</i>	25	3.10	1.88 - 6.25
<i>Ph. trinervium</i>	34	2.06	1.25 - 2.72

One can see that, although one group tends to have leaves with a larger length-width ratio than the other, there is considerable overlap. Similarly, fruit shape varies but without clear breaks that might suggest specific delimitations. In flowering and sterile material, there are few diagnostic characters presently available to suggest that these species differ at all. Without far greater study of variation in living populations throughout the Greater Antilles and the Bahamas, however, I am loathe to designate *Ph. rubrum* and *Ph. trinervium* as conspecific, even though much evidence suggests that they may be. They have been considered distinct for over two centuries; hence, their merger should be accomplished on a basis of far more data than are presented here.

There is biogeographic evidence that *Ph. rubrum* and *Ph. trinervium* are one and the same. One would expect that a species shared between Hispaniola and the Bahamas had migrated from one of these regions to the other via the intervening Turks and Caicos Islands or via Cuba. There are, as yet, no known collections of *Ph. trinervium* from either region; however, it is present in the Bahamas and Hispaniola. On the other hand, *Ph. rubrum* is in Cuba (although not in the Turks and Caicos Islands). If one considers that these two taxa are conspecific, then Cuba may be viewed as the bridge through which the species may have migrated between Hispaniola and the Bahamas. If they are considered distinct species, then the occurrence of *Ph. trinervium* in the Bahamas and Hispaniola without being on any of the intervening islands is anomalous.

Phoradendron racemosum, on the other hand, is completely different from the *Ph. rubrum-trinervium* complex. The fourth species of *Phoradendron* in Britton and Millspaugh's flora, *Ph. northropiae*, is the same as *Ph. racemosum*. *Phoradendron northropiae* is known from only two collections. These were made by John and Alice Northrop, one from Conch Sound on North Andros and one from Mangrove Cay. The two collections are not perceptively different from populations of *Ph. racemosum* from Cuba and are herein interpreted as synonymous with that species.

Some remarks about the publication and typification of *Ph. northropiae* are perhaps in order here. The binomial was attributed to Ignatius Urban in Mrs. Northrop's catalog of plants from New

Providence and Andros (1902). All other names of new species in this paper have descriptions in English. This is the only one in Latin, a strong suggestion that it was composed by a different mind. Therefore, this published name is interpreted as Urban's and not a herbarium name which was published by Mrs. Northrop. Britton and Millspaugh did not use *in* or *ex* in the author citation, but skirted the issue by means of a semi-colon. The citation as defended above is used here with *in*. This becomes of some consequence in selecting a type.

Northrop types are usually considered to be at the New York Botanical Garden whereas, in fact, most of the nomenclatural types which appeared in Mrs. Northrop's 1902 publication are interpreted as being at the Field Museum in Chicago. Dr. John I. and Mrs. Alice R. Northrop traveled to the Bahamas in 1890 to survey the natural history of Andros and New Providence as one of the earliest attempts to study the islands from a scientific viewpoint. Dr. Northrop was on the faculty of Columbia University at the time. He collected birds and other animals and made observations on the rock types. His wife collected plants and eventually published her catalog (*ibid.*), although attributing all collections to both her husband and herself. (Specimens are often cited as being made by only one Northrop, whereas they should be cited as *Northrop and Northrop.*)

A set of specimens was indeed given to the New York Botanical Garden herbarium and many of its contents were named by N. L. Britton. Some were sent abroad for determination. But a private set retained by the Northrops was the one from which many of the illustrations were drawn for Mrs. Northrop's publication. The specimens and illustrations match perfectly in a number of instances. This set was sold to the Field Museum in two batches early in the 1900's, shortly before John Northrop died from an alcohol fire in his laboratory at Columbia University. Because the illustrations accompanying the original descriptions were drawn from the Northrops' private set, I believe the private set (now at Field) should be considered (in most cases) to contain the lectotypes. Mrs. Northrop simply cited a specimen by collection number and did not indicate a holotype or isotype collection. In the case of the specimen of *Ph. northropiae* described by Urban, we have no knowledge whether a specimen was sent to him in Europe or if he examined a specimen when he visited this country. Because the illustration matches the specimen at the Field Museum, that specimen is designated the lectotype and the specimen at NY is designated isolectotype. Had a specimen been sent to Urban, it likely would have been deposited in the Berlin Herbarium which was destroyed in 1943.

As with *Dendropemon*, a biosystematic revision of *Phoradendron* is suggested. The following key is based on the premise that *Ph.*

northropiae is a synonym of *Ph. racemosum* and that *Ph. rubrum*, *Ph. trinervium*, and *Ph. racemosum* are distinct.

KEY TO *PHORADENDRON* SPECIES IN THE BAHAMAS

1. Leaves 6-16 cm long; distinctly petioled (petiole 1-2 cm); branches usually terete.....*Ph. racemosum*
1. Leaves 6.5 cm long or less; scarcely petioled; branches usually angled.....2
2. Joints of inflorescence 4-5; leaves 3 times as long as wide; fruit red; subglobose.....*Ph. rubrum*
2. Joints of inflorescence 2-3; leaves twice as long as wide; fruit yellow, ellipsoidal.....*Ph. trinervium*

Phoradendron racemosum (Aubl.) Krug & Urban, Bot. Jahrb. 24: 46. 1897. Basionym: *Viscum racemosum* Aubl., Fl. Guian. 2: 895. 1775. Lectotype: P.

Phoradendron northropiae Urb. in Northrop, Mem. Torrey Bot. Club 12: 33 + pl. 4. 1902. Type: Andros, Conch Sound, J. I. and A. R. Northrop 551. Holotype: F-130652; Isotype: NY.

Phoradendron rubrum (L.) Griseb. Fl. Brit. W. Ind. Is. p. 314. 1860. Basionym: *Viscum rubrum* L. Sp. Pl. p. 1023. 1753. Type: Bahama Islands (without locality). Lectotype: Catesby, Nat. Hist. Car. Florida. Bahama Is., pl. 81, Vol. 2. Typotype: BM.

Phoradendron trinervium (Lam.) Griseb. Fl. Brit. W. Ind. Is. p. 314. 1860. Basionym: *Viscum trinervium* Lam. Encycl. 3: 57. 1789. Type: Dict. No. 7, Martinique. Lectotype: P-LA.

ACKNOWLEDGEMENTS: I am pleased to acknowledge the advice tendered to me by Dr. Job Kuijt who graciously agreed to read this manuscript. He offered much constructive criticism, editorial comment, and information which he has permitted me to use herein.

My appreciation is extended to Mrs. Alan Kindig who typed the manuscript.

I should like to acknowledge with appreciation the courtesy extended by the Directors and Curators of the herbaria at the Field Museum of Natural History in Chicago and the New York Botanical Garden for permitting me to study their Bahamian collections. Field work in the Bahamas was supported by a generous anonymous grant to the Arnold Arboretum of Harvard University during 1972-74 by a person interested in the Bahama flora, and by a grant to the author from the National Geographic Society for floristic studies in the southern Bahamas and the Turks and Caicos Islands.

LITERATURE CITED

- Adams, C. D. 1972. Flowering plants of Jamaica. University of the West Indies. Mona, Jamaica. 848 pp.
- Baehni, Charles. 1937. *Struthanthus* et *Phthirusa* envisagés comme congénériques. *Candollea* 7: 287-290.
- Barlow, B. A. and D. Wiens. 1971. The cytogeography of the Loranthaceae mistletoes. *Taxon* 20: 219-312.
- Britton, N. L. and C. F. Millspaugh. 1920. The Bahama Flora. Privately published. Reprinted without change of pagination. 1920. Hafner Publishing Co. New York.
- Danser, B. H. 1933. A new system for the genera of Loranthaceae (Loranthoideae). *Verhand. Koninkl. Adad. Wet. Amsterdam Afd. Natuurk.* 29 (6): 1-128.
- Eichler, A. W. and Ign. Urban. 1903. Loranthaceae. *Symb. Antil.* 4: 206-210.
- Engler, A. and K. Prantl. 1897. *Das Pflanzenfamilien, Nachtr.* III. Loranthaceae.
- Grisebach, A. H. R. 1864. *Flora of the British West Indian Islands.* Lovell Reeve & Co., London. 789 pp. reprinted 1963, J. Cramer, Weldon & Wesley, and Hafner Publishing Co.
- Kuijt, Job. 1968. Mutual affinities of Santalalean families. *Brittonia* 20: 136-147.
- _____ and Focko Weberling. 1972. The flower of *Phthirusa pyrifolia* (Loranthaceae). *Ber. Deutsch. Bot. Ges. Bd.* 85: 467-480.
- Léon, Hermano and Hermano Alain. 1951. *Flora de Cuba. 2.* Dicotiledoneas: Casuarinaceas a Meliaceas. *Contr. Ocas. Mus. Hist. Nat. Colegio de La Salle No. 10.* Havana.
- Long, Robert W. and Olga Lakela. 1971. *A flora of tropical Florida.* University of Miami Press. Coral Gables. 962 pp.
- Northrop, Alice R. 1902. *Flora of New Providence and Andros (Bahama Islands).* *Mem. Torrey Bot. Club* 12 (1): 1-98 + 19 pl.
- Stearn, William T. 1968. *Dendropemon, Macrosolen,* and other generic names in Loranthaceae. *Taxon* 17: 157-158.
- Trelease, William. 1915. *Phoradendron,* *Proc. Natl. Acad. Sci.* 1: 30-35.
- _____. 1916. The genus *Phoradendron.* A monographic review. *Univ. Ill. Press.* 224 pp. + 245 pl. Urbana.
- Urban, Ignatius. 1897. *Addimenta ad cognitionem florae Indiae occidentalis. iv. Dendropemon.* *Bot. Jahrb.* 24: 17-29.
- _____. 1920. Loranthaceae: *Phoradendron.* *Symb. Antil.* 8: 186-188.

THE TAXONOMIC STATUS OF
AGERATINA LUCIAE-BRAUNIAE (FERN.) KING & H. ROBINS.¹

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Ageratina luciae-brauniae (Fern.) King & H. Robins. was first described by E. Lucy Braun (1940) as *Eupatorium deltoides* Braun. Braun's name was illegitimate, however, since it is a later homonym of *E. deltoideum* Jacq. This error was corrected when Fernald (1942) proposed the new name *Eupatorium luciae-brauniae* Fern., in honor of its discoverer. King & Robinson (1970) later transferred this species to *Ageratina*, producing the new combination *Ageratina luciae-brauniae* (Fern.) King & H. Robins.

In a revision of *Ageratina* from eastern North America, Clewell & Wooten (1971) placed this species in synonymy under *Ageratina altissima* (L.) King & H. Robins. (= *Eupatorium rugosum* Houtt.) and stated that these are "...bizarre plants showing extreme symptoms of etiolation from growing under limestone [sic] ledges...." Without doubt, *A. luciae-brauniae* is closely related to *A. altissima*, but a number of ecological and morphological differences appear to warrant the retention of *A. luciae-brauniae* at the species level.

Ageratina luciae-brauniae is restricted to the sandy floors of sandstone rockhouses of the Pottsville formation in Tennessee and Kentucky. The term rockhouse refers to cave-like overhangs resulting from differential weathering of sandstone. This unique habitat protects these delicate plants from direct rainfall and, as suggested by Braun (1940), may account for their absence outside the rocky overhangs. Greenhouse studies have shown that the delicate appearance of these plants is a genetically based adaptation and not simple etiolation as suggested by Clewell & Wooten. Transplants of *A. luciae-brauniae* and *A. altissima* were placed in the greenhouse facilities at the University of Tennessee in September, 1974, and were allowed to flower and die back to the rootstocks. These perennials then completed a season's growth in 1975 and have reappeared in February, 1976 (Fig. 1 & 2), with no phenotypic changes that would suggest taxonomic equivalency. In addition, plants of *A. luciae-brauniae* grown from seed in the greenhouse expressed the same phenotype as naturally occurring rock-

¹Contributions from the Botanical Laboratory, The University of Tennessee, Knoxville, N.S. 463.